Dietary patterns

Name	Organization	General comments to the chapter	Specific comments to the chapter	Comments from authors
Juha Lempiäinen	MD, PhD, neurologist, working in University of Helsinki and Terveystalo	It is essential that also vegan diets (whole-foods plant-based diet and other plant-based diets) are also commented in this chapter. There is already plenty of evidence about their healthiness. See for example; https://www.researchgate.net/publication/328030518_Health_and_sustainability_outcomes_of_vegetarian_dietary_patterns_a_revisit_of_the_EPIC-Oxford_and_the_Adventist_Health_Study-2_cohorts AND https://journals.plos.org/plosmedicine/article?utm_campaign=fullarticle&utm_medium=referral&id=10.1371%2Fjournal.pmed.1003889&utm_source=inshorts&fbclid=IwAR0CZmnZzpKhWG3XaV09sXWG_sJ6F-DgirVlbPJP7Ml8AqJX-4B2y9a_TFM	-	Considered and adjusted. We have clarified the paragraph in the FBDGs section. Due to the methods used to derive dietary patterns and the tendency of the general population to consume both animal- and plant-based foods, the qualified systematic reviews used as evidence are unable to distinguish between the possible health effects of vegan or vegetarian diets and mainly plant-based diets that may also contain fish and low-fat dairy products and/or small amounts of meat and other animal-based foods.
Swedish Food Agency	Swedish Food Agency	Gender Where data is available it would be of interest to mention gender. What do we know on differences between women and men concerning dietary patterns and what do we know about differences between women and men about dietary related health outcomes in relation to dietary patterns. Potatoes, fried potatoes, french fries Would welcome more info or comments on potatoes in relation to dietary	- Page 3 the last sentence in the section beginning with "In general, it seems.... It is not clear if the last sentence refers to both patterns mentioned or if it refers only the traditional/mixed dietary patterns. - Page 7 section beginning with "Dietary patterns.... The last part of the section from the sentence starting with "This chapter does not take a stand on the healthiness on vegan diets... deserves a separate section as it presents a new type of dietary pattern	Considered and adjusted. It seems that similar types of patterns can be identified among men and women, but women score higher or are over-represented in the "healthy" patterns. We have added this information in the introduction. The systematic reviews used as evidence in the chapter did not summarize the associations between dietary patterns and health outcomes separately for men and women.

		patterns. In the section about obesity the reference is 23 and fried potatoes is mentioned. In the section on cancer the reference is 26 and french fries is mentioned. Is it possible to give more information on potatoes in dietary patterns. Do we know if potatoes are considered a vegetable if not specifically mentioned as fried? In the section describing western/sweet dietary pattern fried potatoes is mentioned but where are the potatoes in the healthy nordic diet? The sentence on Page 8: To create more specific knowledge on dietary patterns, future studies should consider focusing on more detailed food groups, such as subtypes of vegetables or different types of dairy products. Add "different types of potato"	separate from the dietary patterns high in plant-based foods which is discussed earlier in the section.	We have clarified the sentence to refer to both the "traditional" and "mixed" patterns. In general, potatoes are not considered as vegetables in the referenced systematic reviews, but single studies within them may have differing classifications. Similarly, the Healthy Nordic diet does not include potatoes in the vegetables, berries and fruit –group. To avoid over-emphasizing the role of a single food group (potatoes) in the chapter focusing on the whole diet, we have not added these clarifications in the text. We have, however, added a sentence on page 8 (FBDGs) to encourage future studies to separate between fried and boiled/mashed potatoes. Vegan and vegetarian diets are commented in a separate paragraph.
Jenny Hagberg	Svensk Dagligvaruhandel	- Anti-nutrients and the effect on nutrition . Is this mentioned in any of the other papers/chapters ? Important that this aspect is considered somewhere in the recommendations.	- Results (in the Abstract): The sentence "We also found limited evidence suggesting a relationshop with the decribed dietary patterns in childhood and decreased risk of obesity and hypertension later in life". The phrasing creates confusion about the relationship between sugar-sweetened beverages, sugary foods, refined grains and the decreased (?!) risk of obesity later in life. ..? -Explain what FBDGs means (page 7). Unlcear to the reader.	This chapter focused on dietary patterns (whole-diet), and thus, nutrients or anti-nutrients are outside the scope of this chapter. The dietary patterns mentioned in the abstract are described to be low in red and processed meats, sugar-sweetened beverages, sugary foods, and refined grains. FBDGs (food-based dietary guidelines) are explained in the end of the introduction.

Johanna Kaipiainen (M.Sc, RD), Charlotta Hyttinen (M.Sc)	Finnish Vegan Association	No general comments, see spesific comments.	Page 7. Vegan and other vegetarian diets should not be ignored in this recommendation, because amount of people adhering vegetarian diets are growing. A lot of research has been done on the vegan diets. As long as certain micronutrients are either taken as a supplement or fortified in vegan foods, vegan diets has many health benefits. References: Graig WJ. Health effects of vegan diets. Am J Clin Nutr 2009;89:1627S-1633S. Available: https://academic.oup.com/ajcn/article/89/5/1627S/4596952 Le, L.T.; Sabaté, J. Beyond Meatless, the Health Effects of Vegan Diets: Findings from the Adventist Cohorts. Nutrients 2014, 6, 2131-2147. https://doi.org/10.3390/nu6062131 Page 7. There is already lot of studies, in which dietary patterns among vegans and vegetarians and health effects are compared with different mixed dietary pattern. In two large cohort studies, EPIC-Oxford and Adventist Health Study different dietary patterns are compered. Findings from these cohort studies indicates, that vegan, lacto-ovo-vegetarian and pesco-vegetarian diets are more beneficial for health than semi-vegetarian or low-meat diets. It can therefore be concluded that substitution of red meat with plant and fish protein instead of poultry or lean meat should be preferred in recommendations. Reference: Segovia-Siapco G, Sabaté J. Health and	Considered and adjusted. Vegan diet has now been more clearly mentioned in the discussion. This chapter relies on qualified systematic reviews and thus, separate cohort studies have not been included.

			sustainability outcomes of vegetarian dietary patterns: a revisit of the EPIC-Oxford and the Adventist Health Study-2 cohorts. Eur Jour Clin Nutr 2019;72:60-70. Available: https://doi.org/10.1038/s41430-018-0310-z Page 7: We wish that Nordic Nutrition Recommendations would be in line with Academy of Nutrition and Dietetics' position paper about vegetarian diets. There is a statement in this position paper, that appropriately planned vegetarian, including vegan, diets are healthful, nutritionally adequate, and may provide health benefits for the prevention and treatment of certain diseases. Reference: Academy of Nutrition and Dietetics. Position of the Academy of Nutrition and Dietetics: Vegetarian diets. Journal of the Academy of Nutrition and Dietetics 2016;119:1970-80. Available: https://www.jandonline.org/article/S2212-2672%2816%2931192-3/pdf	
Veronika Haslinger	ICC International Association for Cereal Science and Technology_ Whole Grain Initiative Working Group	a) We welcome the acknowledgment that dietary patterns high in food groups such as whole grains are associated with significant health benefits. b) We support the rationale information that consumption of wholegrain cereals have been linked to reduced risk of cardiovascular disease, cancer, and all-cause mortality. c) We suggest including a specific paragraph for the key food groups contributing to the healthiness of dietary patterns, including whole grains.	d) We also recommend quoting the latest scientific evidence supporting whole grain and health, including (but not limited to): i) A diet a diet low in whole grains was the most common leading dietary risk factor for deaths (in 16 regions) and DALYs (in 17 regions). GBD 2017 Diet Collaborators. Health effects of dietary risks in 195 countries, 1990-2017: a systematic analysis for the Global Burden of Disease Study 2017. Lancet. 2019 May 11;393(10184):1958-1972. doi: 10.1016/S0140-6736(19)30041-8.	Since this chapter focuses on dietary patterns, we don't want to emphasize certain food groups, such as whole grains, too much. This is why the most relevant food groups are mentioned only briefly. There probably is a separate chapter in the recommendations for carbohydrates, including whole grains.

			ii) Higher intakes of whole grains were associated with a 13-33% reduction in the risk for various health outcomes (All-cause mortality, CHD mortality & incidence, Stroke mortality & incidence, T2D incidence, Colorectal cancer incidence, Cancer mortality). Reynolds A, Mann J, Cummings J, Winter N, Mete E, Te Morenga L. Carbohydrate quality and human health: a series of systematic reviews and meta-analyses. Lancet. 2019 Feb 2;393(10170):434-445. doi: 10.1016/S0140-6736(18)31809-9. iii) A diet low in whole grains was the most common leading dietary risk factor for deaths and DALYs in Andean Latin America, the Caribbean, Central Asia, Eastern Europe, high-income North America, North Africa and the Middle East, Oceania, South Asia, Southern Latin America, Western Europe and Western Sub-Saharan Africa. Dong C, Bu X, Liu J, Wei L, Ma A, Wang T. Cardiovascular disease burden attributable to dietary risk factors from 1990 to 2019: A systematic analysis of the Global Burden of Disease study. Nutr Metab Cardiovasc Dis. 2022 Apr;32(4):897-907. doi: 10.1016/j.numecd.2021.11.012.	
Anna-Lena Klapp	ProVeg International	We appreciate that the authors highlight the widely acknowledged health benefits of dietary patterns rich in vegetables, fruits, whole grains, nuts and legumes and low in red and processed meat and sugary foods. We also positively noted the reference to the environmental sustainability of these plant-rich dietary	The following are exemplary excerpts from the systematic reviews conducted by the USDA: Dietary Patterns and All-Cause Mortality [2]: Reduced risk of all-cause mortality was observed in several studies that examined	Considered and adjusted. Vegan diet has now been more clearly mentioned in the discussion.

		patterns. Nonetheless, we would like to draw attention to an important gap in the dietary patterns chapter. This chapter does not take a stand on the healthiness of vegetarian and vegan diets, arguing that there is a low prevalence of vegetarian and vegan dietary patterns in the Nordic countries. However, prevalence is irrelevant because the stated goal of the chapter is to describe the totality of evidence for the role of dietary patterns for health-related outcomes. For example, the consumption of legumes in Norway is very low [1] as well, and yet the (positive) health effects of increased consumption of legumes are addressed in the chapter. In addition, the chapter is based on ten systematic reviews conducted by the USDA (United States Department of Agriculture). The USDA used reviews from all over the world, which means that the NNR Group also bases its health-related statements on data and prevalence from non-Nordic countries. Moreover, vegetarian and vegan diets have been found to be particularly sustainable. This has notably been acknowledged in the chapter on Food consumption and environmental sustainability considerations in the Nordic and Baltic region currently under review. Therefore, if the aim of the new NNR is to integrate sustainability and nutrition, the chapter on dietary patterns	dietary patterns without animal-source foods, such as those described as vegetarian, vegan, or determined by "plant-based" diet indices. Dietary Patterns and Growth, Size, Body Composition, and/or Risk of Overweight or Obesity [2]: Kahleova et al examined the effect of a "low-fat vegan" diet based on different macronutrient distribution with fat below the AMDR at 17.5% energy, compared to fat intake within the AMDR. Participants consuming the "Low-fat vegan" diet had significantly lower lean mass, fat mass, and BMI at 16 weeks. Notably, the duration of follow-up in this study was relative short. Turner-McGrievy et al tested the effects of plant-based based dietary patterns on weight loss without energy restriction and observed significant weight loss in all groups after 6mo. Those assigned to consume a "Vegan" diet lost the most weight compared to either "Semi-vegetarian", "Pesco-vegetarian", or "Omnivore" diets. It should be noted that the study was not powered to detect differences between the "Vegan" compared to "Vegetarian" groups. Dietary Patterns and Risk of Cardiovascular Disease [2]: Some studies showed improved HDL, TC, and LDL levels when comparing diets based on macronutrient distributions within the AMDR compared to outside	

		should also take a stand on the health-related outcomes of vegetarian and vegan diets. Dietary pattern analysis describes a whole pattern instead of single foods and nutrients. So when it comes to examining the relationship between diet and the risk of noncommunicable diseases, vegetarian and vegan dietary patterns should not be excluded, and current evidence on these patterns should be presented. Lastly, it should be mentioned that studies on vegetarian and vegan dietary patterns are included in all systematic reviews conducted by the USDA as well. So if these reviews form the basis of the chapter, the authors could easily use this literature to also present latest evidence on vegetarian and vegan dietary patterns.	with diets that emphasized plant-based elements labeled as "low-fat Vegan" or "dietary guidelines" diet. Dietary Patterns and Breast, Colorectal, Lung, and Prostate Cancer [2]: Finally, one study, Orlich et al, examined various types of vegetarian diets. Results showed that consuming a vegetarian vs. nonvegetarian diet at 58y was associated with a significant reduction in risk of colorectal cancer after 7.3y f/u. When results were broken down by type of vegetarian diet, consuming a pescovegetarian diet vs a nonvegetarian diet at 58y was associated with lower risk, while there were no differences with vegan, lacto-ovo, or semi-vegetarian diets. When results were stratified by sex and race, they were no significant associations in men or Black participants. However, in women and non-black vegetarians, there was a borderline significant lower risk of colorectal cancer. And, vegetarian diet at 58y was not significantly associated with risk of rectal or colon cancer after 7.3y f/u, when they were analyzed separately. Finally, Tantamango-Bartley et al examined various iterations of a vegetarian diet in relation to risk of prostate cancer. Results showed that consuming a vegan diet vs. a nonvegetarian diet was associated with a significantly lower risk of prostate cancer after 7.8y f/u. However, when stratified by race, results were only significant in white participants and not in black participants.	

			In addition, consuming vegan, vegetarian, and nonvegetarian diets were not significantly associated with risk of advanced prostate cancer. In addition, we would like to refer to the 2020-2025 Dietary Guidelines for Americans which states that a healthy vegetarian dietary pattern is a variation of the Healthy U.S.-Style Dietary Patterns that have the same core elements [3]. We recommend that the authors of this chapter at least state that a balanced vegetarian and vegan diet is a form of a healthy eating pattern that can have several health benefits. We also recommend mentioning which foods can be part of a healthy vegetarian or vegan dietary pattern instead of animal based foods, an example can be found in the US guideline as well.[3] References: [1] doi: 10.3390/nu14153080 [2] https://nesr.usda.gov/2020-dietary-guidelines-advisory-committee-systematic-reviews [3] https://www.dietaryguidelines.gov/sites/default/files/2020-12/Dietary_Guidelines_for_Americans_2020-2025.pdf	
Anna-Lena Klapp	ProVeg International	This is the second part of the consultation submission by ProVeg International. In this part, we would like to discuss a gap identified in the dietary patterns chapter, i.e. the fact that potential health and food safety risks of	The health benefits of fish consumption are well documented. However, potential food safety and health risks remain with regards to toxicants absorbed by fish in polluted waters and ultimately consumed by humans, especially in the Baltic sea.	The chapter does not make recommendations for healthy fish consumption levels, but merely states that, according to the qualified systematic reviews, fish seems to be a part of a health-

		high consumption of fish from polluted waters are not being discussed by the authors. Our answers are outlined in the 'Specific Comments' section. About ProVeg International ProVeg International is a food awareness organisation working with decision-making bodies, companies, investors, the media, and the general public to help the world transition to a society and economy that are less reliant on animal agriculture and more sustainable for all humans, animals, and our planet. ProVeg has long-standing expertise on sustainable and healthy plant-rich nutrition. It has permanent observer status with the UNFCCC, special consultative status with ECOSOC, is accredited for UNEA, and has received the United Nations' Momentum for Change Award. It is also an official observer to the IPCC.	The chapter should be transparent about this potential health hazard related to high fish consumption. We strongly suggest that the authors review the relevant scientific literature and evaluate the persistent risks for consumers before making recommendations for healthy fish consumption levels. In the background paper on food consumption and environmental sustainability that is currently under review, the authors acknowledge that the Baltic sea is 'highly polluted' (p.59) and adopt a 'precautionary approach' to recommendations of increased fish consumption. Industrial activity near the coastlines and military waste from the second World War have been linked to high levels of persistent organic pollutants (POPs), such as dioxins, polychlorinated dibenzofurans (PCDD/Fs), polychlorinated biphenyl (PCBs), as well as toxic heavy metals including methylmercury, arsenic, lead and cadmium in the Baltic sea. [1] Some claim that the Baltic sea is one of the most polluted in terms of POPs.[2] Despite a significant decrease in toxicant levels due to effective environmental measures in the last decades, pollution still remains. Examining three basins along the Polish Baltic coast, Preisner, Smol & Szoldrowska (2021) find that concentrations of Cadmium, Mercury, and lead still exceeded safety levels in 2017 and 2018. [3] Jarosz-Krzeminska, Mikolajzcyk & Adamiec (2020) find that levels of Pb in	promoting dietary pattern. A separate chapter on fish is probably included in the recommendations.

			Baltic cod exceed EU maximum levels of concentration per kg body weight by five times, and maximum levels for Cd by 2 times. [4] To what extent the remaining pollution in the Baltic sea still poses a health risk to consumers of seafood from these waters is uncertain. A quick review of a dozen recent studies shows mixed findings. However, several authors still find alarming results. Karjalainen et al. (2013) find that 1 - 15% of Finnish children exceeded USEPA reference value intakes of methylmercury from fish. [5] Mikolajczyk, Warenik-Bany & Pajurek (2021) find that intake of PCDD/Fs and PCBs from Baltic fish for adults and children exceeds WHO tolerable weekly intake levels for nearly all examined species. [6] What is more, the Swedish National Food Administration still recommends pregnant women to limit their consumption of Baltic herring and other fish, including perch, pike, and burbot, because of mercury and PCB pollution in the Baltic sea. [7] Given these findings and the remaining uncertainty about potential health and food safety risks from Baltic fish consumption for consumers, we strongly recommend that the researchers conduct a thorough review of the existing literature on the matter and treat any recommendations for higher fish intake with precaution.	

			References: [1] DOI:10.13140/RG.2.2.11144.85769/1 ; https://doi.org/10.1002/jsfa.10911 ; https://doi.org/10.1016/j.chemosphere.2022.135614 [2] https://doi.org/10.1016/j.marpolbul.2021.112763 [3] doi: 10.5004/dwt.2021.27325 [4] https://doi.org/10.1002/jsfa.10911 [5] https://doi.org/10.1016/j.fct.2012.02.074 [6] https://doi.org/10.1016/j.marpolbul.2021.112763. [7]https://www.livsmedelsverket.se/globalassets/publikationsdatabas/andra-sprak/rad-om-mat-till-dig-som-ar-gravid/advice-about-food-for-you-who-are-pregnant.pdf.	
David Stenholtz	Läkare för framtiden (organisationsnummer 802476-0665)	Excellent overall!	The abstract to the report summarizes the results as: "Strong or moderate evidence linked dietary patterns high in vegetables, fruits, whole grains, fish, low-fat dairy, and legumes and low in red and processed meats, sugar-sweetened beverages, sugary foods, and refined grains with beneficial health outcomes, such as reduced risk of cardiovascular disease, type 2 diabetes, obesity, cancer, bone health, and premature death." The inclusion of "low-fat dairy" in this sentence is surprising considering: 1. The report itself presents heterogenous data concerning low-fat dairy and health with several connections between low-fat	Considered and adjusted. Vegan diet has now been more clearly mentioned in the discussion. Low-fat dairy and fish are included in the list of foods because many (but not all) of the systematic reviews mentioned them. This chapter focuses on whole-diet, not on nutrients and thus, conclusions about nutrients are not included in the chapter.

			dairy and increased disease risk. 2. It implies that individuals eating whole foods plant based diets, vegetarian or vegan diets should add low-fat dairy to their diets. 3. Nutrients in dairy can be obtained from plant based food items. (1) 4. Dairy production is in multiple aspects more detrimental to the environment compared to plant based alternatives. (2, 3) Suggestion: Remove "low-fat dairy" from this sentence. The inclusion of "fish" as a separate food item in a healthy, recommended dietary pattern is problematic because: 1. It implies that individuals eating whole foods plant based diets, vegetarian or vegan diets, should add fish to their diets. 2. Nutrients in fish can be obtained from plant based food items. (4) 3. Production of fish is in multiple aspects more detrimental to the environment compared to plant based alternatives. (5, 6) Suggestion: Replace "fish" and "legumes" in this sentence with "healthy protein sources (fish and/or legumes)" On page 7, the text reads "Moreover, there is no evidence linking low levels of meat consumption with adverse health outcomes." This sentence is highly biased to discourage people from giving up meat. The fact that no exact limit is proven	

			where meat starts to cause disease can also be expressed as "The data available for evaluation does not permit a conclusion about whether a safe level of meat consumption exists." as expressed by WHO regarding their evaluation of carcinogenity of meat. (7) Suggestion: Change the sentence as suggested above. (1) Melina et al, Position of the Academy of Nutrition and Dietetics: Vegetarian Diets, J Acad Nutr Diet. 2016 Dec;116(12):1970-1980. (2) Poore et al, Reducing food's environmental impacts through producers and consumers, Science. 2018 Jun 1;360(6392):987-992. (3) Clark et al, Multiple health and environmental impacts of foods, Proc Natl Acad Sci U S A. 2019 Nov 12;116(46):23357-23362. (4) Melina et al, Position of the Academy of Nutrition and Dietetics: Vegetarian Diets, J Acad Nutr Diet. 2016 Dec;116(12):1970-1980. (5) Poore et al, Reducing food's environmental impacts through producers and consumers, Science. 2018 Jun 1;360(6392):987-992. (6) Clark et al, Multiple health and environmental impacts of foods, Proc Natl Acad Sci U S A. 2019 Nov 12;116(46):23357-23362. (7) https://www.who.int/news-room/questions-and-answers/item/cancer-	

			carcinogenicity-of-the-consumption-of-red-meat-and-processed-meat	
Ann-Kristin Sundin	Lantbrukarnas Riksförbund, LRF	Dear NNR Committee, Thank you for the opportunity to comment on the Dietary patterns draft. Here are the comments from LRF. The chapter needs a more balanced approach, including studies on both the risks and benefits of a particular dietary pattern (or food/nutrient, as that level is mentioned in the draft as well). There are not only health benefits of a more plant-based diet/decreased meat consumption, although this is implied in the draft. Failure to recognize that pose a risk to a large part of the general public.	On cardiovascular disease, we question the conclusion that only low-fat dairy products are associated with a decreased risk. For instance, Sendra (2020) concludes that "…current knowledge points to the more appropriate recommendation of moderate consumption of full-fat dairy foods within a healthy lifestyle". This is also supported by Astrup et al (2020), stating that "several foods relatively rich in SFAs, such as whole-fat dairy, dark chocolate, and unprocessed meat, are not associated with increased CVD or diabetes risk." Sendra, E. Dairy Fat and Cardiovascular Health. Foods 2020, 9, 838. https://doi.org/10.3390/foods9060838 Astrup A et al. Saturated fats and health: A reassessment and proposal for food-based recommendations: JACC State-of-the-art Review. JACC. 2020;76(7):844-57. We need to point out that most associations between dietary patterns and the different NCDs are based entirely on US FBDG scientific reviews (references: 23-32 are from here - no others included). It would have been suitable to refer to other studies/organisations for sake of balance. Below are some examples of such. Referring to research on food matrix, we strongly question including "full-fat milk" in the "unhealthy pattern", as well as indicating that a diet lower in "high-fat dairy" decrease the risk of diabetes type 2.	The paragraph refers to a dietary pattern that has been found to associate with lower risk of CVD. Dairy products or other specific, separate food groups were not of interest in this chapter, but the whole-diet (dietary pattern). A separate chapter probably discusses dairy products as well as red meat in more detail. These systematic reviews were qualified by the NNR committee to serve as the basis for this chapter and thus, no separate literature search was performed. The recommended pattern is a synthesis of the qualified systematic reviews and in those, low level of (red) meat consumption was identified as a characteristic of a healthy dietary pattern.

			Jee Yeon Hong, Ji Seon Lee, Hye Won Woo, Ae Son Om, Chang Keun Kwock & Mi Kyung Kim (2021) Meta-analysis of randomized controlled trials on calcium supplements and dairy products for changes in body weight and obesity indices, International Journal of Food Sciences and Nutrition, 72:5, 615-631, DOI: 10.1080/09637486.2020.1856794 "...a decrease of risk /of diabetes type 2/ with increasing consumption (whole grains, fruits, and dairy)" Lukas Schwingshackl, Georg Hoffmann, Anna-Maria Lampousi, Sven Knüppel, Khalid Iqbal, Carolina Schwedhelm, Angela Bechthold, Sabrina Schlesinger, Heiner Boeing. Food groups and risk of type 2 diabetes mellitus: a systematic review and meta-analysis of prospective studies. Eur J Epidemiol. 2017 May;32(5):363-375. "Total dairy product consumption is associated with a lower risk of T2D..." Celia Alvarez-Bueno, Ivan Cavero-Redondo, Vicente Martinez-Vizcaino, Mercedes Sotos-Prieto, Jonatan R Ruiz, and Angel Gil. Effects of Milk and Dairy Product Consumption on Type 2 Diabetes: Overview of Systematic Reviews and Meta-Analyses. Adv Nutr. 2019 May; 10(Suppl 2): S154–S163. Throughout the Dietary pattern draft, meat is presented as a food contributing to health risks. There is a lack of balance referring to the many health benefits to including moderate amounts of meat in a	

			healthy, balanced, and varied diet. The nutrient quality and quantity of, e.g., iron, zinc, and protein, makes meat a very purposeful part of the diet for a large portion of the generat population, not the least children and adolescents, women in fertile ages, and elderly and frail. Given the fact that nutrient deficiency in general, and iron deficiency in particular, is a major health issue among vulnerable subgroups, it would be suitable to mention this in the context in question. Livsmedelsverket: Riksmaten för vuxna, 2010-11 Livsmedelsverket: Riksmaten Ungdom, 2016-17 Socialstyrelsen. Problems of nutrition in health care and human services. ISBN 91-7201-560-8	
Victoria Thuillier	Lantbrukarnas Riksförbund, LRF	Dear NNR Committee, Thank you for the opportunity to comment on the Dietary patterns draft. Here are the comments from LRF.	On mortality and dairy, there are several studies finding a beneficial or neutral association between dairy intake and mortality. For instance: Cavero-Redondo et al (2019) concludes that "dairy product consumption is not associated with risk of all-cause mortality." Ivan Cavero-Redondo, Celia Alvarez-Bueno, Mercedes Sotos-Prieto, Angel Gil, Vicente Martinez-Vizcaino, and Jonatan R Ruiz. Milk and Dairy Product Consumption and Risk of Mortality: An Overview of Systematic Reviews and Meta-Analyses. Adv Nutr. 2019 May; 10(Suppl 2): S97–S104. Milk and Dairy Product Consumption and Risk of Mortality: An Overview of Systematic Reviews and Meta-Analyses - PMC (nih.gov)	This chapter focuses on the whole diet (dietary patterns) and does not examine the associations between separate food groups, such as dairy products or red meat, and health outcomes. The sentence referring to the environmental sustainability is based on a reference and was added to the text based on the reviewers' suggestion.

			Cancer Research UK concludes that "there is not enough good evidence to prove that milk and dairy can cause cancer". They further state that "eating and drinking milk and dairy products can reduce the risk of bowel cancer". Thus, "the NHS Eatwell Guide recommends having some dairy as part of a healthy, balanced diet". (Cancer Research UK: Can milk and dairy products cause cancer?) WCRF International states that "The Panel did not base a recommendation on the strong evidence that the consumption of dairy products decreases the risk of colorectal cancer as there is some other evidence that is suggestive of an increased risk of prostate cancer, although that evidence fell below the general threshold required for making a recommendation. WCRF: "Meat, fish, dairy and cancer risk." As meat, or a diet pattern including meat, is indicated throughout the draft as being unhealthy, it is important to recognize the difference between relative and absolute risks – a large relative risk increase from a low risk level still results in a small risk increase in absolute terms. Lastly, the authors claim that "Dietary patterns higher in plant-based foods and lower in animal-based foods are environmentally more sustainable than patterns high in animal-based foods". This claim, however, is too simplistic to hold true. We have previously submitted an	

			array of comments to the drafts and background papers touching upon and focusing on environmental sustainability. It is also contradicts the statement in the disclaimer paragraph: "Please note that sustainability aspects and other issues /…/ will be integrated at a later stage, if relevant."	
Malina Andersson Lee	OATLY AB	We welcome the opportunity to contribute to the public consultation on the review of Dietary patterns for the Nordic Nutrition Recommendations 2022. Plant-based foods, such as vegetables, fruits, and whole grains, are adequately represented in the scientific synthesis. Integrating more plant-based foods in the diet, while restricting the amounts of processed or red meat and sugar-sweetened beverages, can bring significant health benefits and should be encouraged by public policies. However, we take the view that the inclusion of low-fat dairy in the healthy dietary pattern (in the abstract and on page 7) is uncritical and warrants further consideration. There are two major weakness in the evidence for low-fat dairy, compared to the other foods, that need addressing: Firstly, the other foods display consistent and biologically plausible associations with both morbidity outcomes, as well as total mortality. In contrast, low-fat dairy is not associated with reduced all-cause mortality. In fact, the associations	Page 1. Results, lines 3-4. - Low-fat dairy should be handled separately due to inconsistencies in findings with respect to cancer, lack of effect on type 2 diabetes or premature death, as well as weak proof of causality (mechanism). See General comments. - Regular consumption of nuts is negatively associated with total mortality and CVD and warrants to be mentioned in the results. Page 3. Obesity. - Line 4: What does "moderate intake of dairy products" stand for? "Moderate" suggests a different association compared to the other foods, such as an U-shape. This needs to be explained. - Line 6 & 9: Food referred to as 'refined grains' need clarification (definition). Putative mechanisms are also lacking (mechanism section). It is refined grains as opposed to whole grains, or is it the glycemic load that is addressed? Are sugars included in that group? Page 4. "Most studies have also shown regular consumption of nuts and legumes and moderate consumption of alcohol to be beneficial in reducing CVD risk".	This chapter focuses on the whole diet (dietary patterns) and does not examine the associations between separate food groups, such as dairy products or nuts, and health outcomes. The mechanism section briefly discusses the role of sugars in diet, but does not separately describe all the potential mechanisms the nutrients in different foods may be involved in. The order of the health outcomes was dictated by the NNR.

		between high consumption of low-fat dairy and health outcomes are heterogenous. The data presented shows that consumption of low-fat dairy is negatively associated with obesity, CHD, colon and rectal cancer, and positively associated with bone health. However, for other health outcomes dairy showed either no association, or a positive association; - Risk of type 2 diabetes, no association with low-fat dairy. Full-fat dairy was positively associated with risk of type 2 diabetes. - Breast cancer, no association with low-fat dairy, but moderate evidence for a positive association with animal-source foods. - Lung cancer, positive association for both full fat and non-fat dairy. - Neurocognitive health and gestational weight gain, no association with low-fat dairy. Secondly, establishing causality between an exposure (i.e., low-fat dairy) and health outcomes requires a plausible mechanism. This is lacking for low-fat dairy. Food based dietary guidelines are offered in 62% of the countries in Europe (1). The majority recommend dairy foods (2). About half of European FBDGs recommend 2–4 servings of dairy per day, and >80% of the FBDGs contain some form of specific 'dairy messaging' (1). Messaging generally focuses on selecting low-fat and fat-free options, as well as fermented dairy foods and a	Strength of evidence for these associations are lacking. Page 5. Bone health, lines 5-7. It is not representative of the rest of the chapter to omit mentioning of the results because of limited number of studies. The references should be presented for transparacy, and preferably also the results, even if the conclusion is that there is insufficient evidence to determine the relationship. Page 6. Mortality. Mortality is the outcome variable of utmost importance, and should be mentioned first. Other outcomes, such as NCDs, are also important but secondary to mortality. Food can positively impact one outcome and negatively impact another outcome, be heterogeneous. Total mortality is of outmost importance, not only for the individual, but also for assessing the totality of the evidence. Page 7. FBDGs, first paragraph. See comment above (P 1. Results, lines 3-4.) with respect to low-fat dairy and nuts. Page 7. FBDGs, third paragraph. Frequent intake of unsaturated vegetable oils is included in the dietary pattern associated with reduced risk of all-cause mortality. Data presented suggests that it is protective of obesity and neurocognitive health but not for CVD. The lack of association with CVD needs a comment. It seems at odds with the reduced total mortality not to include unsaturated vegetables oils in the "healthy" dietary	

		variety of cheeses. Many countries emphasize dairy's calcium contributions, while only a few mentions other nutrients (3; Note). The health-focused messaging specific to dairy food intake merge around bone, teeth, and muscle, cardiometabolic, and gut health. Vitamins and minerals, e.g. vitamin D, potassium and calcium, have been implicated in the pathology of for instance healthy blood pressure, bone health and prevention of colorectal cancer. Dairy has traditionally been a liable source of these nutrients. However, there are plant-based alternatives that are equally rich sources of these nutrients, e.g. fortified plant-based drinks. Several plant-based drinks, such as oat drinks, also provide unsaturated fats and dietary fiber. In contrast, cow's milk contain protein that stimulates serum IGF-1 concentrations, which promote cellular growth (4-6). There is also a relationship between a high-protein intake in early childhood (≤ 18 months), particularly of animal origin, and higher BMI later in childhood (7). Such mechanisms may account for negative effects of milk. The heterogeneity in the evidence with respect to the health effects of dairy, together with the uncertainties with respect to mechanisms, warrants revision of the conclusions with respect to dairy. Should the authors decide to include low-fat dairy in the healthy dietary patterns in the conclusions, it should be separated	pattern in the abstract (Results). This needs clarification. REFERENCES (see General comments): 1. Comerford KB, et al. Global Review of Dairy Recommendations in Food-Based Dietary Guidelines. Front Nutr. 2021 May 25;8:671999. 2. Herforth A, et al. A Global Review of Food-Based Dietary Guidelines. Adv Nutr. 2019 Jul 1;10(4):590-605. doi: 10.1093/advances/nmy130. Erratum in: Adv Nutr. 2019 Jul 1;10(4):730. 3. Note: For example, Belgium includes messaging on achieving adequate protein, vitamin B2 and B12, while Sweden includes messaging on consuming dairy for vitamin D, Iceland for iodine, and North Macedonia for potassium . Globally, most messaging recommending the inclusion of dairy in the dietary food based dietary recommendations is focused on calcium. The second next common messaging is related to vitamin D, iodine, potassium, and protein. Messaging related to overconsumption, in relation to dairy, is focused on saturated fat, added sugars, and salt. 4. Hoppe et al. Animal protein intake, serum insulin-like growth factor I, and growth in healthy 2.5-y-old Danish children. Am J Clin Nutr 2004;80:447–52. 5. Rogers et al. Milk as a food for growth? The insulin-like growth factors link. Public Health Nutr 2006;9:359–68. 6. Ohlsson et al. The role of liver-derived	

		from the other foods, and the lack of evidence with respect to total mortality, as well as the heterogeneity with respect to different health outcomes, should be made clearly discernible. References are listed in the end of Detailed comments.	insulin-like growth factor-I. Endocr Rev 2009;30:494–535. 7. Arnesen EK, et al. Protein intake in children and growth and risk of overweight or obesity: A systematic review and meta-analysis. Food Nutr Res. 2022 Feb 21;66.	
Plant-food Sweden	Plant-food Sweden	Plant-Food Sweden welcomes the opportunity to contribute to the public consultation on the review of Dietary patterns for the Nordic Nutrition Recommendations 2022. Plant-based foods, such as vegetables, fruits, and whole grains, are adequately represented in the scientific synthesis. Integrating more plant-based foods in the diet, while restricting the amounts of processed or red meat and sugar-sweetened beverages, can bring significant health benefits and should be encouraged by public policies. According to the evidence here presented, there are foods for which there is strong and consistent evidence for an association with lower risk of all-cause mortality, as well as with major NCD outcomes (obesity, CVD, and certain cancers). These foods are a high amount of vegetables, fruits, legumes, nuts, whole grains and sea food and a low amount of red and processed meat, high-fat dairy, and refined carbohydrates or sweets. For other foods, the data are heterogenous, such as nuts, oils and low-fat dairy:	Plant-Food Sweden welcomes the opportunity to contribute to the public consultation on the review of Dietary patterns for the Nordic Nutrition Recommendations 2022. Plant-based foods, such as vegetables, fruits, and whole grains, are adequately represented in the scientific synthesis. Integrating more plant-based foods in the diet, while restricting the amounts of processed or red meat and sugar-sweetened beverages, can bring significant health benefits and should be encouraged by public policies. According to the evidence here presented, there are foods for which there is strong and consistent evidence for an association with lower risk of all-cause mortality, as well as with major NCD outcomes (obesity, CVD, and certain cancers). These foods are a high amount of vegetables, fruits, legumes, nuts, whole grains and sea food and a low amount of red and processed meat, high-fat dairy, and refined carbohydrates or sweets. For other foods, the data are heterogenous, such as nuts, oils and low-fat dairy:	As this chapter deals with dietary patterns rather than with separate foods, we tried to describe the patterns as shortly as possible, so we don't list all the foods that have been linked to a dietary pattern with probable health outcomes. Most of the systematic reviews included in the chapter have described dietary patterns on food level (e.g., fish, meat) rather than nutrient level (e.g., saturated fat, unsaturated fat) and thus, mostly foods, not nutrients are discussed. This chapter did not separate between plant- and animal-based foods. We simply deduced that vegetables, fruit, whole grain products, fish, legumes, and low-fat dairy were most often mentioned in the studies as parts of a healthy dietary pattern. Lean meat, nuts and unsaturated vegetable oils were also mentioned, but with lower frequency.

		1. NUTS Regular consumption of nuts is associated with reduced risk of all-cause mortality and CVD according to the data presented and should be mentioned in the results in the abstract and in the FBDGs-section. 2. OILS Higher intake of unsaturated vegetable oils is associated with reduced risk of all-cause mortality according to the data presented. The data presented also suggests that it is protective of obesity and neurocognitive disease, but not CVD. However, consumption of monounsaturated fat instead of saturated fat is associated with decreased risk of mortality from heart-disease, respiratory disease, and certain types of cancer (1). This is also reflected in the chapter on Fats and oils. Unsaturated vegetable oils should, thus, be mentioned in the results in the abstract and in the FBDGs-section. 3. LOW-FAT DAIRY Low-fat dairy is not associated with reduced risk of all-cause mortality. Moreover, the associations between high consumption of low-fat dairy and health outcomes are heterogenous (not strong and consistent, as currently stated). It is important to make sure that foods are included/excluded in a dietary pattern in accordance with the evidence,	1. NUTS Regular consumption of nuts is associated with reduced risk of all-cause mortality and CVD according to the data presented and should be mentioned in the results in the abstract and in the FBDGs-section. 2. OILS Higher intake of unsaturated vegetable oils is associated with reduced risk of all-cause mortality according to the data presented. The data presented also suggests that it is protective of obesity and neurocognitive disease, but not CVD. However, consumption of monounsaturated fat instead of saturated fat is associated with decreased risk of mortality from heart-disease, respiratory disease, and certain types of cancer (1). This is also reflected in the chapter on Fats and oils. Unsaturated vegetable oils should, thus, be mentioned in the results in the abstract and in the FBDGs-section. 3. LOW-FAT DAIRY Low-fat dairy is not associated with reduced risk of all-cause mortality. Moreover, the associations between high consumption of low-fat dairy and health outcomes are heterogenous (not strong and consistent, as currently stated). It is important to make sure that foods are included/excluded in a dietary pattern in accordance with the evidence, to avoid distorting regulations and recommendations. In this respect, it seems arbitrary to include low-fat dairy in	

		to avoid distorting regulations and recommendations. In this respect, it seems arbitrary to include low-fat dairy in the "healthy" dietary pattern in the results in the abstract and in the FBDGs-section, but not nuts and oils. We would like to see a rebalancing to ensure that dietary guidelines treat plant-based and animal-based foods equally. SUGGESTION: - Remove "low-fat dairy" from the "healthy dietary pattern" - Consider including nuts and oils in the "healthy dietary pattern" REFERENCE: Zhuang et al. Dietary Fats in Relation to Total and Cause-Specific Mortality in a Prospective Cohort of 521 120 Individuals With 16 Years of Follow-Up. Circ Res. 2019 Mar;124(5):757-768.	the "healthy" dietary pattern in the results in the abstract and in the FBDGs-section, but not nuts and oils. We would like to see a rebalancing to ensure that dietary guidelines treat plant-based and animal-based foods equally. SUGGESTION: - Remove "low-fat dairy" from the "healthy dietary pattern" - Consider including nuts and oils in the "healthy dietary pattern" REFERENCE: Zhuang et al. Dietary Fats in Relation to Total and Cause-Specific Mortality in a Prospective Cohort of 521 120 Individuals With 16 Years of Follow-Up. Circ Res. 2019 Mar;124(5):757-768.	
Julie Donatzsky	Plantebranchen - The Danish Plant-based Business Association	Plantebranchen welcomes the opportunity to contribute to the public consultation on the review of Dietary patterns for the Nordic Nutrition Recommendations 2022. Plant-based foods, such as vegetables, fruits, and whole grains, are adequately represented in the scientific synthesis. Integrating more plant-based foods in the diet, while restricting the amounts of processed or red meat and sugar-sweetened beverages, can bring significant health benefits and should be encouraged by public policies.	No specific comments	As this chapter deals with dietary patterns rather than with separate foods, we tried to describe the patterns as shortly as possible, so we don't list all the foods that have been linked to a dietary pattern with probable health outcomes. Most of the systematic reviews included in the chapter have described dietary patterns on food level (e.g., fish, meat) rather than nutrient level (e.g., saturated fat, unsaturated fat) and thus, mostly foods, not nutrients are discussed. This chapter did not separate between plant- and animal-based

		According to the evidence here presented, there are foods for which there is strong and consistent evidence for an association with lower risk of all-cause mortality, as well as with major NCD outcomes (obesity, CVD, and certain cancers). These foods are a high amount of vegetables, fruits, legumes, nuts, whole grains and sea food and a low amount of red and processed meat, high-fat dairy, and refined carbohydrates or sweets. For other foods, the data are heterogenous, such as nuts, oils and low-fat dairy: 1. NUTS Regular consumption of nuts is associated with reduced risk of all-cause mortality and CVD according to the data presented and should be mentioned in the results in the abstract and in the FBDGs-section. 2. OILS Higher intake of unsaturated vegetable oils is associated with reduced risk of all-cause mortality according to the data presented. The data presented also suggests that it is protective of obesity and neurocognitive disease, but not CVD. However, consumption of monounsaturated fat instead of saturated fat is associated with decreased risk of mortality from heart-disease, respiratory disease, and certain types of cancer (1). This is also reflected in the chapter on Fats and oils. Unsaturated vegetable oils should, thus,		foods. We simply deduced that vegetables, fruit, whole grain products, fish, legumes, and low-fat dairy were most often mentioned in the studies as parts of a healthy dietary pattern. Lean meat, nuts and unsaturated vegetable oils were also mentioned, but with lower frequency.

		be mentioned in the results in the abstract and in the FBDGs-section. 3. LOW-FAT DAIRY Low-fat dairy is not associated with reduced risk of all-cause mortality. Moreover, the associations between high consumption of low-fat dairy and health outcomes are heterogenous (not strong and consistent, as currently stated). It is important to make sure that foods are included/excluded in a dietary pattern in accordance with the evidence, to avoid distorting regulations and recommendations. In this respect, it seems arbitrary to include low-fat dairy in the "healthy" dietary pattern in the results in the abstract and in the FBDGs-section, but not nuts and oils. We would like to see a rebalancing to ensure that dietary guidelines treat plant-based and animal-based foods equally. SUGGESTION: - Remove "low-fat dairy" from the "healthy dietary pattern" - Consider including nuts and oils in the "healthy dietary pattern" REFERENCE: Zhuang et al. Dietary Fats in Relation to Total and Cause-Specific Mortality in a Prospective Cohort of 521 120 Individuals With 16 Years of Follow-Up. Circ Res. 2019 Mar;124(5):757-768.		
Puk Holm	Danish Agriculture & Food Council	Thank you for the opportunity to comment on the chapter on Dietary	The authors claim that: "Dietary patterns higher in plant-based foods and lower in	Since the chapter operates on whole-diet level and many studies

		Patterns. First of all, we would like to recognize the approach on diets as a whole. We endorse the turn in nutrition science to evaluate diet rather than nutrients in isolation. This is very much in line with the emerging food matrix science which takes a holistic approach to nutrition and diet. This approach is also recognized by the World Cancer Research Fund (WCRF) (1). It is repeatedly stated, throughout the chapter that a low or lower intake of red and processed meat is associated with good health, and a high or higher red and processed meat intake is linked with diseases. Levels of low or high intake is not specified in the text and is therefore left to interpretation. What low or high refers to ought to be reflected specifically in the results. It seems that the systematic reviews made out to the 2020 American Dietary Guidelines Advisory Committee also forms the main background to this chapter (2). To specify an amount their scientific evidence supports a recommendation of approx. 800 grams/week of meat (red and white) and eggs (cooked/edible weight), in a 2000 kcal diet (3). The presence of meat in a healthy diet is also supported by the WCRF. They recommend limiting the intake of red meat to 350-500 g a week. The recommended amount provides a balance between the advantages and the disadvantages of eating red meat (4). Just as we need to balance intake of all	animal-based foods are environmentally more sustainable than patterns high in animal-based foods". Thereafter they argue that the recommended pattern would be more sustainable that current diets in the Nordic Countries. It is premature to draw conclusions on sustainable food choices in the Nordic region as these papers are either not published or on public hearing. We ask that sustainable issues are omitted from the chapter.	only use consumption frequencies, it is impossible to state exact levels for each of the separate food groups. We trust that these are dealt with in separate food group – specific chapters. This chapter does not take a stand on the association between meat intake and health outcomes.

		foods as they both challenges and supports health with their content of potential toxins and nutrients. Red and processed meat is again described negatively, and the text implies that intake in the Nordic countries should be reduced substantially and literature describing weak or no link between meat and disease is not included (5-12). Studies on meat are grouping the meat heterogenously and are frequently grouped with foods that have little or no nutritional value; sugar-rich foods/drinks and alcohol, which insinuate that these foods are equivalent in a health perspective. Red meat is a good source of many valuable nutrients, such as high-quality protein, B-vitamins, iron and zink, and including moderate amounts of red meat in the diet may be beneficial to healthl, especially regarding certain nutrients (13,14). Processed meat is not a homogenous group of foods and shouldn´t be treated as such (15). Populations groups of high meat consumption often have a less healthy diet and lifestyle, than groups that consume less meat. It is difficult to draw conclusions on potential negative associations between meat consumption and disease without considering other risk factors, such as lifestyle, overall diet and clinical factors that may be a confound (14,16). Although high intake		

		of red and processed meat can be associated with increased risk of some non-communicable diseases in some studies, the chapter should emphasize that this association might not be causal. When meat is part of a healthy diet, the associations seem to weaken and even disappear (17). In fact, the benefits of meat in the diet due to the content of essential nutrients and beneficial aspects is hardly discussed in the chapter. The chapter needs a much more balanced approach to meat as part of a healthy diet, as of now the text solely describes red meat as a health risk. We argue that the chapter should also enclose the health benefits of including moderate amounts of lean meats, both red and white meat, in a balanced and varied diet.		
Anna Maria Karlsen	FoodDrinkNorway/NHO Mat og Drikke	1. References vs. health outcomes We have noticed that the paragraph regarding health outcomes only refers to the US FBDG 2020 process for all NCDs (ref. 23-32). No other scientific evidence is referred to in this paragraph. Further, the authors state that most of the qualified systematic reviews cover the timeframe up until 2019. Thus, studies published in 2019—2022 have not been covered (p. 8). We question the scientific quality of the conclusions in the chapter, based only on the US process for FBDGs as the source of evidence. 2. Environmental sustainability We have noticed that the paragraph on FBDGs refers to dietary patterns higher	None	The systematic reviews included were deemed qualified by the NNR committee and thus, no separate literature search was performed. Even though the systematic reviews were performed in the US, the studies included in them were from all around the world. We don't think it is probable that such substantial amount of contradicting results would have been published in 2019—2022 that the conclusions would be significantly different. This chapter deals with dietary patterns, not with specific food groups, such as meat, and does not aim to establish recommended

		in plant-based foods and lower in animal-based foods that are environmentally more sustainable (p. 7). We ask that the NNR2022 chapter on dietary patterns should omit conclusions about sustainability until all background papers on environmental sustainability are completed. 3. Red and processed meat The chapter states that a low or lower intake of red and processed meat is associated with good health. However, the intake level is not specified. The US FBDGs 2020 as the main reference refers to dietary advice of 800 g/week of meat and eggs (cooked/edible weight), whereas the Norwegian dietary advice is a maximum of 500 g (cooked weight). This difference in intake in the US vs. Norway should be noticed in the discussion and in the process of establishing FBDGs in Norway.		food intake levels for separate food groups.
Eilin Lundekvam By, senior rådgiver ernæring	MatPrat	As we do not eat nutrients or food in isolation, but numerous different foods in combination, with biological components that interact, it is highly likely that it is the overall eating pattern that affects our health. Thus, we appreciate that NNR2022 includes a chapter that focuses on the diet as a whole, and that the dietary pattern approach will be included in the basis for setting and updating FBDGs. This is in line with the emerging food matrix science which takes a holistic approach to nutrition and diet. According	References 1. Dietary Guidelines Advisory Committee. 2020. Scientific Report of the 2020 Dietary Guidelines Advisory Committee: Advisory Report to the Secretary of Agriculture and the Secretary of Health and Human Services. U.S. Department of Agriculture, Agricultural Research Service, Washington, DC. https://www.dietaryguidelines.gov/sites/default/files/2020-07/ScientificReport_of_the_2020DietaryGuidelinesAdvisoryCommittee_first-print.pdf	This chapter deals with dietary patterns, not with specific food groups, such as meat, and does not aim to establish recommended food intake levels for separate food groups.

		to the American dietary committee 2020: " (..) growing evidence that components of a dietary pattern may have interactive, synergistic, and potentially cumulative relationships that can predict overall health status and disease risk more fully than can individual foods or nutrients (1)". WCRF also supports this perspective: «(..) it appears increasingly unlikely that specific foods, nutrients or other components of foods are themselves important singular factors in causing or protecting against cancer: rather, different patterns of diet and physical activity combine (…) the alterations that lead to (..) hallmarks of cancer (2).» Throughout the text it is repeatedly stated that a low/lower red and processed meat intake is associated with good health, and a high/higher red and processed meat intake is linked with diseases. Which intake levels "low" or "high" refer to, is not stated and left open for interpretation. The main scientific basis of this chapter is systematic reviews conducted to inform the American dietary guidelines (2020), and the 2020 Dietary Guidelines Advisory Committee concluded that the scientific evidence supports a recommendation of approx. 800 grams/week of meat (red and white) and eggs (cooked/edible weight), in a 2200 kcal diet (3). We would argue that their recommendation	2. World Cancer Research Fund/American Institute for Cancer Research. Diet, Nutrition, Physical Activity and Cancer: A Global Perspective.; 2018. https://www.wcrf.org/wp-content/uploads/2021/02/Summary-of-Third-Expert-Report-2018.pdf 3. U.S. Department of Agriculture and U.S. Department of Health and Human Services. Dietary Guidelines for Americans, 2020-2025. 9th Edition. December 2020 https://www.dietaryguidelines.gov/sites/default/files/2020-12/Dietary_Guidelines_for_Americans_2020-2025.pdf	

		suggests a moderate meat intake. Thus, the wording in the chapter is not consistent with the Americans' conclusion on a healthy meat intake, which is based on the same scientific reports. We would argue that WCRF in their latest report (2018) also recommends a moderate red meat intake: limit the intake of red meat to 350-500 g a week (cooked/edible weight). Even though the report states that it is not necessary to include meat in the diet to meet nutritional requirements, the report emphasizes that the recommendation is not to completely avoid meat. The recommended amount provides a good balance between the advantages and the disadvantages of eating red meat (2). What "low" or "high" red and processed meat intake refers to, should also be reflected in the results where the authors write: "Strong or moderate evidence linked dietary patterns high in vegetables, fruits, whole grains, fish, low-fat dairy, and legumes and low in red and processed meats, sugar-sweetened beverages, sugary foods, and refined grains with beneficial health outcomes, such as reduced risk of cardiovascular disease, type 2 diabetes, obesity, cancer, bone health, and premature death".		
Johanna Eén	Svenskt Kött	Dear NNR Committee, Thank you for the opportunity to comment upon the draft on Dietary Patterns. Please find below the	Several different sources can provide the same nutrients. However, the differences in bioavailability between different foods ought to be underlined. Please see, for	The chapter did not establish an "unhealthy pattern", but described the existing evidence on the associations between dietary

		comments from Svenskt Kött. The draft focuses extensively on the connection between different foods and patterns, and diagnoses. In this context, the risk of not consuming important nutrients in sufficient quantities also ought to be highlighted, as well as specific nutritional needs among different subgroups. It is positive that the authors underline the need for further knowledge about dietary patterns and more studies in certain subgroups, such as children, adolescents and elderly. In the chapter on dietary patterns in NNR2012, it is stated that animal foods such as meat, dairy products and egg are important sources of protein and minerals, and that the risk of certain diagnoses can be reduced by replacing some (not all) processed and red meat with plant-based foods. The World Cancer Research Fund International emphasizes that the recommendation is not to avoid meat as the food contributes to important nutrients, not at least protein, iron, zinc and vitamin B12. NNR2012 also states that several studies of complete diets have shown a connection between a diet that follows the official nutrition and dietary recommendations and clear positive health effects. Animal foods, including fish and low-fat dairy products, which are highlighted in the current recommendations, contribute, like meat, to important nutrients. However, full-fat	example, C. Mayer Labba 2022; Nutritional limitations of a green protein shift with focus on iron. Since many consumers rely on processed meat substitutes rather than fresh and homemade vegetarian food, attention also ought to be paid to plant-based meat substitutes. Please see C. Mayer Labba 2022; Nutritional composition and quality of meat substitutes available on the Swedish market, as well as S. Bryngelsson et al 2022; Nutritional assessment of plant-based meat analogues on the Swedish market. Not least, the studies found flaws in terms of iron and bioavailability in the meat substitutes. Page 3, third paragraph: To mention meat in the sentence "… a frequently identified dietary pattern in the Nordic countries is also a "Western" or a "sweet" dietary pattern, which consists of foods typically considered unhealthy, such as fried potatoes and fast food, meat products, sweets and soft drinks" is misleading. In contrast to sweets and fast food, meat is a nutrient-dense food that provide several important nutrients and minerals in a varied and healthy diet. Page 7, third paragraph: To state that "red and processed meat may link to poor health via various pathways" is misleading and requires both a context and an in-depth discussion where the contribution of meat to good health via important nutrients is described.	patterns and health outcomes. The systematic reviews used as evidence in the chapter found that a dietary pattern lower with high-fat dairy was associated with reduced risk of type 2 diabetes and risk of all-cause mortality. Not mentioning these findings would endanger the scientific quality of the chapter. As this chapter focuses on dietary patterns rather than specific foods or nutrients, bioavailability and nutrient contents of meat substitutes are beyond the scope of the chapter. As dietary patterns high in (red) meat were mostly found to be unfavorable in terms of health, it makes more sense to explain the potential mechanisms between meat consumption and adverse health effects. As this chapter cannot go into detail in specific food groups, in-depth discussion on the role of meat cannot be included. This chapter does not focus on vegan or vegetarian diets and thus, the potential challenges of these diets are not discussed.

		milk should not be included in the "unhealthy pattern". Please see, for example, E. Sendra, 2020; Dairy fat and cardiovascular health; A. Astrup et al 2020; Saturated fats and health: A reassessment and proposal for food-based recommendations: JACC State-of-the-art Review; J. Yeon Hong et al, 2021; Meta-analysis of randomized controlled trials on calcium supplements and dairy products for changes in body weight and obesity indices; C. Alvarez-Bueno et al 2019; Effects of milk and dairy product consumption on type 2 diabetes: Overview of systematic reviews and meta-analyses.	Page 7, fifth paragraph: To state that "dietary patterns higher in plant-based foods and lower in animal-based foods are environmentally more sustainable than patterns high in animal-based foods" is misleading, especially when it comes to the Nordic countries. There are plant-based diets that are reprehensible from an environmental perspective, as well as animal productions contributing to extensive environmental benefits and ecosystem services. The sentence "…there is no evidence linking low levels of meat consumption with adverse health outcomes" ought to be clarified. Of interest in this context is the fact that consumers following a vegan or largely plant-based diet need supplements of at least vitamin B12. Iron deficiency, not at least at a young age, can cause severe conditions, and heme iron is basically only found in animal foods. Almost every third teenage girl in certain ages in Sweden suffers from iron deficiency (Riksmaten Ungdom, 2018). In addition, girls exclude meat from their diet to a larger extent than boys.	
Malén Gudbrandsgard	MatPrat Norwegian Egg and Meat Council	In the chapter red and processed meat is portrayed exclusively negatively, and the text implies that intake should be substantially reduced. Also, red and processed meat are frequently grouped together with foods that have little or no nutritional value; sugar-rich foods/drinks and alcohol, which insinuate that these foods are equivalent in a health	References 1. Helsedirektoratet. 2012. Norkost 3. En landsomfattende kostholdsundersøkelse blant menn og kvinner i Norge i alderen 18-70 år, 2010-11. 2. Dietary Guidelines Advisory Committee. 2020. Scientific Report of the 2020 Dietary Guidelines Advisory Committee: Advisory Report to the Secretary of Agriculture and	This chapter does not establish recommendations for meat intake levels or whether to increase or decrease its intake. Lean meat was mentioned in the chapter as being part of a dietary pattern associated with lower risk of colon and rectal cancer, lung cancer, and all-cause mortality. The studies included in

		perspective. The chapter needs a much more balanced approach to meat as a part of a healthy diet. Red meat is a good source of many valuable nutrients, such as high-quality protein, B-vitamins, iron and zink, and including moderate amounts in the diet may be beneficial to nutritional status(1). Processed meat refers to a broad range of products, of which several have a decent nutrient profile and also have the Key hole in Norway. A clear weakness in the literature is that meat is often treated as homogenous group, which also is the case in this chapter. However, there are significant variations in nutrient content in different meats and meat products. E.g., the fat content differs between 2-40% depending on type of meat and cut. This and that red and processed meat can contribute with important nutrients should be acknowledged. According to cited systematic reviews in the chapter, there is moderate evidence that dietary patterns higher in lean meats, amongst others, is linked with lower risk of colon and rectal cancer as well as lower all-cause mortality. Furthermore, it does not appear to be scientific evidence that lean meat is a contributing risk factor for cardiovascular disease, type 2 diabetes or obesity (2). Research also suggest that poultry intake is associated with lower	the Secretary of Health and Human Services. U.S. Department of Agriculture, Agricultural Research Service, Washington, DC. https://www.dietaryguidelines.gov/sites/default/files/2020-07/ScientificReport_of_the_2020DietaryGuidelinesAdvisoryCommittee_first-print.pdf 3. Pagliai G, Dinu M, Madarena MP, Bonaccio M, Iacoviello L, Sofi F. Consumption of ultra-processed foods and health status: a systematic review and meta-analysis. Br J Nutr. 2021;125(3):308. doi:10.1017/S0007114520002688 4. Gregório MJ, Rodrigues AM, Eusébio M, et al. Dietary Patterns Characterized by High Meat Consumption Are Associated with Other Unhealthy Life Styles and Depression Symptoms. Front Nutr. 2017;4(June). doi:10.3389/fnut.2017.00025 5. Alexander DD, Weed DL, Miller PE, Mohamed MA. Red Meat and Colorectal Cancer: A Quantitative Update on the State of the Epidemiologic Science. J Am Coll Nutr. 2015;34(6):521-543. doi:10.1080/07315724.2014.992553 6. Alexander DD, Cushing CA. Red meat and colorectal cancer: A critical summary of prospective epidemiologic studies. Obes Rev. 2011;12(5):472-493. doi:10.1111/j.1467-789X.2010.00785.x 7. Maximova K, Moez EK, Dabravolskaj J, et al. Co-consumption of Vegetables and Fruit, Whole Grains, and Fiber Reduces the Cancer Risk of Red and Processed Meat in a Large Prospective Cohort of Adults from Alberta's Tomorrow Project. Nutr 2020,	the systematic reviews that were used as evidence in this chapter, have tried to adjust their results for potential confounding, although we agree that it is impossible to remove all counfounding. In addition, this chapter aims to describe dietary patterns (whole-diet) and does not take a stand on separate food groups, such as meat.

		risk of some diseases. We question why these research findings are not mentioned, and argue that it should be stated in the chapter that lean meat can be a part of a healthy dietary pattern. People that have a high meat consumption also often have a less healthy diet, are less physically active and have an overall less healthy lifestyle than people that consume less meat (3-6) . It is difficult to conclude on the potential negative associations between meat consumption and disease without considering other risk factors, such as lifestyle, diet and clinical factors that may be a confound. When meat is part of a healthy diet, the associations seem to weaken and even disappear (7) . Although high intake of red and processed meat can be associated with a small increased risk of some non-communicable diseases in some studies, the chapter should discuss that this association might not be causal and the substantial limitations in the research. Weaknesses in the research are recently described in Lescinsky et al: "While there is some evidence that eating unprocessed red meat is associated with increased risk of disease incidence and mortality, it is weak and insufficient to make stronger or more conclusive recommendations. More rigorous, well-powered research is needed to better understand and quantify the relationship between consumption of unprocessed	Vol 12, Page 2265. 2020;12(8):2265. doi:10.3390/NU12082265 8. Lescinsky H, Afshin A, Ashbaugh C, et al. unprocessed red meat: a Burden of Proof study. 2022;28(October). doi:10.1038/s41591-022-01968-z 9. Vernooij RWM, Zeraatkar D, Han MA, et al. Patterns of Red and Processed Meat Consumption and Risk for Cardiometabolic and Cancer Outcomes. Ann Intern Med. 2019;(15). doi:10.7326/m19-1583	

		red meat and chronic disease (7).» Vernooij et al concluded that "Low- or very-low-certainty evidence suggests that dietary patterns with less red and processed meat intake may result in very small reductions in adverse cardiometabolic and cancer outcomes (8)". We ask the authors of the chapter to consider their findings . In summary, we contend that the chapter also should emphasize the health benefits of including moderate amounts of lean meats, both red and white meat, in a balanced and varied diet Lastly, the authors claim that dietary patterns higher in plant-based foods and lower in animal-based foods are environmentally more sustainable. Thereafter they argue that the recommended pattern would be more sustainable that current diets in the Nordics. It is premature to draw conclusions on sustainable food choices in the Nordic region as these NNR2022 papers are not finished. We ask that sustainable issues are omitted from the chapter.		
Tanja Kalchenko	Physicians Association for Nutrition Norway - PAN Norway	The healthy dietary patterns include fish and some dairy products. These foods are the biggest sources for pollutants PCB and dioxines (in Norwegian diet, for example, despite Norwegians eat too little fish according to recommentations. (formated text is here https://pan-norway.org/2023/01/06/innspill-til-	none	This chapter describes the associations between dietary patterns (whole diet) and health outcomes and does not deal with separate food groups, nutrients, or toxins. Answers to 3 questions: 0. We don't know. This is not the topic of the chapter.

		kapittel-healthy-dietary-patterns-i-nnr-2022/) Norwegian Authorities, The Norwegian Scientific Committee for Food and Environment (Vitenskapskomiteen for mat og miljø) have this report: VKM Report 2022: 16 Risk assessment of dioxins, furans, and dioxin-like PCBs in food in Norway Scientific Opinion of the Panel on Contaminants of the Norwegian Scientific Committee for Food and Environment Citation of this report, page 28: "Dioxins and dioxin-like (dl-) PCBs are lipophilic environmental chemicals with long half-lives. We are exposed to dioxins and dl-PCBs mainly through consumption of foods with high fat content, like meat, dairy products and fish. Exposure over the years and accumulation in the body may be of health concern. In the newly published risk assessment from the European Food Safety Authority (EFSA, 2018) the tolerable weekly intake (TWI) was reduced from 14 to 2 pg/kg bodyweight/week. According to the EFSA report, the European population is exposed to		1. This chapter did not aim to examine, from which sources we should get certain nutrients. Rather, the aim was to summarize the existing evidence between existing dietary patterns and health outcomes. 2. This chapter does not aim to establish recommended intake levels for separate food groups.

		dioxins and dl-PCBs above the new TWI, and the main food contributors of dioxins and dl-PCBs are fish, seafood, meat, egg and dairy products." The chapter Dietary patterns – for the Nordic Nutrition Recommendations 2022 does not see anything about how dietary patterns and health outcomes are influated by these pollutants. I ask NNR 2022 to answer the following 3 questions: 0. How is the status in the other Nordic countries? 1. Is it nessesary and/or benefitial to consume these products just to get the relevant nutrients accuratly from "the main food contributors of dioxins and dl-PCBs are fish, seafood, meat, egg and dairy products"? My suggestion is that it is the healthiest way to get relevant nutrients from supplements - instead of food with pollutants PCB and dioxines. The other sources of nutrients are: --EPA and DHA omega-3 fatty acids from seaweed oils (EPA og DHA - they are only essensial for pregnant women, lactationg women and children younger than 2 years old). --Vitamin D from syntetic Vitamin D		

		supplement --Iodine from supplement or/and enriched foods and salt --Selen from paranuts, sunflower seeds and eventually supplements. 2. If NNR 2023 finds that there are some risks or disadvantages of this choice (substitution of meat, dairy products and fish with alternative sources of including supplements for these nutrients), then: Which of these foods (meat, dairy products and fish,) and in which amounts, should be choosen as recommended sources of EPA+DHA, vitamin D, iodine and selen? Norwegians eat too little fish according to existing recommendations, and get too much PCB and dioxins. If Norwegians exclude meat, egg and dairy products, and increase amounts of fish up to recommended level og intake, will Norwegians get enough EPA/DHA, vitamin D, iodine and selen?		
L.M. Granskog	concerned citizen	There are repeated claims that people should eat more fruits, vegetables, whole grains, legumes, fish, low fat dairy and advice to limit red and processed meat, sugar sweetened beverages and refined grains. Grain is fed to animals to fatten them up. According to the results of the	The new "Food Compass" apparently is claiming that cornflakes are healthier to eat than a cheeseburger, and that SSB (sugar sweetened beverages) are more healthy to consume than beef. (https://now.tufts.edu/2021/10/14/ranking-healthfulness-foods-first-worst	This comment does not relate with the topic of the chapter.

		HUNT health investigations in Norway, 2 out 3 people in Norway over the age of 20 are overweight, and the number of people with diabetes has doubled over the past 20 years. Those who reported hard physical training also had increases in BMI, the training did not protect them against weight gain. (https://www.ntnu.no/c/document_library/get_file?uuid=39f55de6-bdec-4cdo-aa31-117b5069cc5f&groupId=247512). There has also been an Increase in obesity in the US and diabetes is prevalent (https://www.cdc.gov/diabetes/data/statistics-report/index.html https://doi.org/10.1016/j.nut.2015.02.007) . Lee et.al. 2022, (https://doi.org/10.3389/fnut.2021.748847) reviewed data on the American diet from 1800 to 2019. They found that processed and ultra-processed foods have dramatically increased during the last two centuries from less than 5 percent of foods to more than 60 percent. There has been a large increase in consumption of sugar, white and whole wheat flour (this would be considered "whole grains" ?), rice, poultry, eggs, vegetable oils, dairy products, and fresh vegetables. Polyunsaturated fats from vegetable oils have increased while saturated fats from animal sources have declined. The rise in non-communicable diseases (NCDs) parallels the increased consumption of processed foods, including sugar, refined flour, rice, and vegetable oils, while the	https://www.nature.com/articles/s43016-021-00381-y) The first author in the reference list is also the first author of the Food Compass article in Nature. See general comments with regard to cornflakes. This is mind boggling.	

		consumption of saturated fats from animal sources was inversely correlated with NCDs (https://doi.org/10.3389/fnut.2021.748847). A multivariate analysis of fast food transactions found that only soft drink intake is correlated with changes in BMI; not animal fat products (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3949530/pdf/BLT.13.120287.pdf/). Apparently Americans have been following dietary recommendations to cut down on fat and increase carbohydrates for over 40 years, and this is strongly correlated with the rise in obesity (https://doi.org/10.1016/j.nut.2015.02.007) . My understanding is that the dietary guidelines are to advise people who are healthy, and that those with health problems are expected to discuss diet with their doctors. Do people really need advice if they are healthy? It would appear that the dietary guidelines are not written for most people, if two out of three are overweight and increasing numbers of people are getting type 2 diabetes. People react very differently to foods, and continuous glucose monitoring (CGM) helps people to figure out how they react, but cornflakes and milk appears to cause glucose elevation in the prediabetic range in most people (https://doi.org/10.1371/journal.pbio.2005143). Many people consider common commercial breakfast cereals to be "whole grain" food which is recommended. Personalized guideline		

		recommendations are apparently needed for the majority of the population (https://academic.oup.com/advances/article/8/4/532/4558118) .		
Elisabet Rytter	Swedish Food Federation	X	HEALTH OUTCOMES RELEVANT FOR NORDIC AND BALTIC COUNTRIES Associations between dietary patterns and the different NCDs are based entirely on systematic reviews found in US FBDG (references 23-32). No other references are included. We suggest more sources of references are assessed and included if deemed relevant, e g World Cancer Research Fund and Cancer Research UK. We welcome the integration of environment impact in NNR 2022, but it is stated that sustainability will be integrated at a later stage, if relevant, after the background articles on sustainability are available. We therefore suggest that the text about sustainability at page 7 (paragraph 4 under headline FBDs) is removed.	The systematic reviews used in the chapter were deemed qualified by the NNR committee and thus, no additional literature search was performed. Even though the systematic reviews were performed in the US, the studies included in them were from all over the world. The health outcomes were selected as instructed by the committee. The text about sustainability was added on request of the peer reviewers.

Meal patterns

Name	Organization/Affiliation	General comments	Detailed comments	Comment from authors
Minna Storm	Turku University/Medical Faculty/Funtional Food Forum	We´re currently running two projects with the focus on health behavior change and preventive health and well-being through personalized nutrition		Considered, not adjusted
Johanna Kaipiainen (M. Sc), Charlotta Hyttinen (M. Sc)	Finnish Vegan Association	It would be good to mention here the dental health aspect too.		Considered, not adjusted
Liisa Korkalo	University of Helsinki	"Meal patterns in Nordic and Baltic countries": Since the section does not discuss preschool-aged children, it may be worth adding that according to our study, in Finnish 3- to 6-year old children attending full-time day-care, the typical meal pattern on a weekday seemed to be 5 meals per day: breakfast, lunch, afternoon snack, dinner and evening snack. Of these, the first 3 meals were provided by the early childhood education and care food services. With regard to energy intake, lunch and dinner were the two larger meals, whereas the three other meals (breakfast, afternoon snack and evening snack) each contributed a roughly equal amount of energy. https://doi.org/10.3390/nu11071531 "Eating frequency": in this section, when discussing the RCTs, it would be important to give some more information on the length and other characteristics of the studies. For example the sentence "Results from RCTs showed beneficial effects on glucose (17) […] with higher eating frequency" may be too simplified to give a balanced description of the findings. The review by Garcidueñas-Fimbres (17)	Abstract, row 2: "The effect of meal patterns" should be "the evidence on the effect of meal patterns" page 2: the last sentence of the page is unclear page 3, 3rd sentence: It would be good to add a reference here. page 3: It would be useful to define or explain further the terms homeostatic and hedonic body weight regulation. A Google Scholar search "hedonic body weight regulation" returns no hits. page 3, row 4: "meal patterns including timing". I suggest replacing by "meal patterns", because it was stated in the beginning of the chapter that the definition of meal patterns includes timing. page 3 row 6, "increased risk". The effect can be positive of negative. I suggest rewriting the sentence. Table 1: Since there is an endless number of different styles of fasting, it is probably safer to change the heading "Description" to something like	"meal patterns.."We thank the responder from the public consultation of this notion. We have now included the following in the manuscript:" In Finnish preschool children aged 3-6 years (N=557) 88-100 % of the days recorded (1-4 days) included breakfast, lunch, afternoon snack, dinner and evening snack of whom the lunch and dinner meals contributed most to the total energy intake (Korkalo). Regulatory breakfast eating was also reported among 6 year old Icelandic children (N=4360) (Aanesen)". 1. Korkalo L, Nissinen K, Skaffari E, Vepsäläinen H, Lehto R, Kaukonen R, Koivusilta L, Sajaniemi N, Roos E, Erkkola M. The Contribution of Preschool Meals to the Diet of Finnish Preschoolers. Nutrients. 2019; 11(7):1531. https://doi.org/10.3390/nu11071531 2. Aanesen A, Katzmarzyk PT, Ernstsen L. Breakfast skipping and overweight/obesity in first grade primary school children: A nationwide register-based study in Iceland. Clin Obes. 2020; 10:e12384. https://doi.org/10.1111/cob.12384. **"eating frequancy":** This is an important comment, and we have now included: "An important notion with regard to some of the RCTs included in the reviews is about the eating frequencies that was compared and the duration of the studies. For instance in the

		includes two short-term interventions that compared 1 meal per day to 3 meals per day. Three meals per day is obviously a 'higher' frequency than one meal per day, but this is still a relatively low frequency, as no snacks were eaten during the intervention. The meal pattern in the group that had only one meal per day could actually be described as intermitted fasting. In other words, it could be said that some of the studies included in the review compared intermittent fasting to a pattern of 3 meals per day. The discussion on mechanisms seems to be missing some key issues. For example, are the associations between breakfast skipping and poorer health outcomes related to changes in the energy intake or diet quality over the rest of day? Or changes in appetite and satiety? Something else? Or are the associations between breakfast skipping and poorer health outcomes explained by generally unhealthier diets and lifestyle habits in the groups reporting this habit? See discussion for example in https://doi.org/10.1016/j.jacc.2019.01.065 and comment in https://doi.org/10.1016/j.jacc.2019.02.033	"Examples of the pattern". page 4, paragraph 3: "16 were included reporting search terms, inclusion/exclusion criteria". The sentence is unclear. page 6, row 8: Is a single arm CT relevant for setting guidelines? page 7, rows 10 to 11: This interpretation is based on short-term studies. Perhaps the sentence can be rewritten for clarity. Section: "Data gaps for future research", 1st paragraph: Please describe what is meant by diet quality. How has it been assessed in these studies? Page 9. This sentence is unclear: "Trials also including statistical analyses taken the meal patterns of the whole day into consideration with regard to energy and nutrient intake." Page 9: This sentence could be moved to the chapter that deals with intermittent fasting: "With regard to intermittent fasting, a higher loss of lean mass during intermittent fasting compared to continuous energy restrictions has been reported (42,53)." Section "Mechanisms": Perhaps the heading of this section should be"Circadian rhythms and chrono-type". Please see the general comment on mechanisms above.	review by Garcidueñas-Fimbres (17) 2 of the 6 RCTs compared two low eating frequencies (1 meal eaten during early evening versus 3 main meals per day) and the duration time of the RCTs ranged from 12 h to 18 weeks (17)" in the section of Eating frequency. We decided not to include anything about intermittent fasting in this section. We agree about the comment and have now included: "In this regard, more research is needed on the influence of eating breakfast on cardiovascular health. Results from the National Health and Nutrition Examination Survey III (Rong) confirmed the findings from the meta analysis by Takagi et al. (), but causality has not yet been proven. Thus, eating breakfast may be an epiphenomenom linked to dietary intake and other life style factors (i.e. sleep and physical activity) (Ibáñez)" in the section of Research gaps. 1. Rong S, Snetselaar LG, Xu G, Sun Y, Liu B, Wallace RB, Bao W. Association of Skipping Breakfast With Cardiovascular and All-Cause Mortality. J Am Coll Cardiol. 2019 Apr 30;73(16):2025-2032. doi: 10.1016/j.jacc.2019.01.065. PMID: 31023424. 2. Ibáñez B, Fernández-Alvira JM. Breakfast Is a Marker for Cardiovascular Risk Prediction. J Am Coll Cardiol. 2019 Apr 30;73(16):2033-2035. doi: 10.1016/j.jacc.2019.02.033. PMID: 31023425.